Burnt Corral Vegetation Management Project Transportation Report

(Draft Report by: L. Haubrick 10-05-2016; Updated by N. Warnke & D.Vincelette 11-26-2019)

Executive Summary

The Burnt Corral Vegetation Management Project (hereinafter referred to as BC) is located on the North Kaibab Ranger District (NKRD) of the Kaibab National Forest (KNF); within Coconino County, Arizona. BC is approximately, 28,090 acres in size and lies within the southwest portion of the Kaibab Plateau, south-southwest of Lookout Canyon and Forest Service Road (FSR) 22, The project lies within Townships 35-37 North, Ranges 1 West -1 East, in Coconino County, Arizona, Gila and Salt River Baseline and Meridian.

Of the 28,090 acres within the Burnt Corral Vegetation Management Project (BC) boundary polygon, about 24,600 acres (85.4%) are within ¼ mile of roads (162 miles +/-) that are designated for motorized use by the public as shown on the Motor Vehicle Use Map (MVUM) (See figure 1). These roads are considered disturbed areas due to regular use. Performing upkeep or maintenance and/or hauling timber on these roads should have minimal impact due to existing conditions. General road maintenance is covered under a categorical exclusion 36 CFR § 220.6(d)4 for Forest Service Roads. Activities that restore, rehabilitate, or stabilize lands (i.e., decommissioning or restore to a natural state) occupied by roads and trails is covered under a categorical exclusion 36 CFR § 220.6(2)19.

To access another 1851 acres (6.6%), approximately 40 miles of existing roads in storage (Maintenance Level 1) could be utilized or be opened for the duration and purposes of the project. These additional 40 miles of roads are only 1/3 of the roads in storage within the project. When you combine the 40 miles of Maintenance Level 1 closed roads with the MVUM open roads (ML2, ML3), it will provide direct access to approximately 26,477.4 acres, or 94.3% of BC's 28,090 total acres.

The remaining 5.7% or 1,610 acres may need additional temporary roads in order to implement thinning activities within those particular areas. However, the majority of these non-accessible acreages exist in the western portion of the project area where there are steep slopes and sensitive soils area, as well as the non-Ponderosa pine vegetation type (i.e., Pinyon-Juniper, scrub oak, and New Mexico honey locust). Roads are only needed to access the Ponderosa pine vegetation, not theses other lower lying areas (i.e., the 5.7 %) that are made up of a different vegetation type.

Introduction

The USDA Forest Service (FS), Kaibab National Forest (KNF) North Kaibab Ranger District (NKRD) proposes to mechanically thin and use wildland fire (both managed and prescribed fire) on approximately 16,920 acres, and use or manage wildland fire only on the remaining 11,530 acres, within the BC area that is approximately 28,090 acres total. (See page 14 for maps of vegetation types and proposed treatment areas) The overall objective of BC is to improve ecosystem resilience and function at the landscape scale in order to sustain healthy forests and watersheds for future generations.

Law, Regulation & Policy

Federal Water Pollution Control Act and Amendments of 1972 (Clean Water Act) [Federal facilities water pollution control responsibilities (33 U.S.C. 1323) under the Clean Water Act (33 U.S.C. 1251, 1254, 1323, 1324, 1329, 1342, 1344)]: Enacted to restore and maintain the chemical, physical, and ecological integrity of the Nation's waters. Provides for measures to prevent, reduce, and eliminate water

pollution; recognizes, preserves, and protects the responsibilities and rights of States to prevent, reduce, and eliminate pollution, and to plan the development and use (including restoration, preservation, and enhancement) of land and water resources; and provides for Federal support and aid of research relating to the prevention, reduction, and elimination of pollution, and Federal technical services and financial aid to state and interstate agencies and municipalities for the prevention, reduction, and elimination of pollution.

Established goals for the elimination of water pollution; required all municipal and industrial wastewater to be treated before being discharged into waterways; increased Federal assistance for municipal treatment plant construction; strengthened and streamlined enforcement policies; and expanded the Federal role while retaining the responsibility of states for day-to-day implementation of the law.

TITLE 36 - Parks, Forests, and Public Property, Chapter II – Forest Service, Dept. of Agriculture, Part 212 – Travel Management, Subpart B – Designation of Roads, Trails, and Areas for Motor Vehicle Use

FSM 7700 Transportation System (FSM 7731 FSH 7709.59 Road Operations)

36 CFR § Part 212. Subpart B created the road system definition as determined by the designated public transportation system or Motor Vehicle Use Map (MVUM) of Forest Service trails and roads. The Forest Service Handbook 7709.59 provides further guidance of 36 CFR and provides definitions and general Forest Service policy and regulations with regard to the FS KNF-NKRD road system.

There are five maintenance levels of roads on the forest service system. For the operational maintenance level 1 roads; this analysis assumes that these selected Forest Service System closed roads will not be reconditioned but will be brought up on temporary basis with minimal maintenance required as described in the FSH 7709.59 so that timber hauling can commence and the roads are considered to be “Ready for Use”. The impact of this road maintenance for these closed roads in storage as described in the FSH 7709.56 are minimal. In addition, these roads will be used for a short duration and on a temporary basis just so the timber can be extracted and then closed for long term storage again after the work is complete. During the closure the roads shall be put into a state that works toward the best management practices (Best Management Practices) for erosion control of roads.

Maintenance level 2 shall be maintained in a high clearance vehicle drivable state during the life of the restoration. This consists of maintaining road system drainages before, during, and after extreme rutting, when using utilizing heavy equipment or machinery for timber harvesting and transport to the local mill.

Maintenance level 3 shall be maintained throughout the life of the restoration process when using heavy machinery to maintain safe passage for passenger style vehicles.

The effects of terrain and topography on the road system is substantial. Existing roads at a slope greater than 8% are susceptible to higher erosion potential. Use of these roads will create additional wear on the road and will necessitate the need for additional maintenance measures and additional drainage features to meet BMP goals.

If wildlife restrictions within the BC area have been identified, there may be timing restrictions which may influence which roads can be accessed and when for large equipment.

Analysis Methods

To determine the Forest Service System Roads that are potentially affected; the BC boundary was overlaid using Geographical Information System (GIS) tools with our Transportation Roads GIS data layer to quantify the total mileage of roads. This analysis included the entire length of the FSR 22 which is the main access road which extends beyond the boundary of the BC Boundary. For the MVUM, roads are classified by symbols which show whether or not a road is open to the public. If a road has a symbol 0, then the road is closed to the public and no vehicle traffic is allowed on these roads by the public, a symbol 1 is a road that is open to the public for both Non Highway Legal and Highway Legal vehicles (does not require the vehicle to be registered), and symbol 3 is roads that are for highway legal vehicles only (requires the vehicle to be registered). From the analysis conducted there are a total of approximately 290.5 miles of roads within the Burnt Corral Boundaries (See table below). The break down is 125.7 miles of operational maintenance level 1 roads that are closed to the public, 115.3 miles of operational maintenance level 2 roads open to the public and 2.7 miles of operational maintenance level 2 roads closed to the public, and a total of 49.5 miles (mostly the FSR 22) of operational maintenance level 3 roads open to the public. This represents a total of 162.1 miles of roads open to the public and a total of 128.4 miles of roads closed to the public.

Total Miles of Roads within Burnt Corral	MVUM Roads "Closed" to Public	MVUM Roads "Open" to Public	Total Miles
1 - BASIC CUSTODIAL CARE (CLOSED)	**125.7**	**0.0**	**125.7**
2 - HIGH CLEARANCE VEHICLES	**2.7**	**112.6**	**115.3**
3 - SUITABLE FOR PASSENGER CARS	**0.0**	**49.5**	**53.0**
Grand Total	**128.4**	**162.1**	**290.5**

MVUM Roads in to Burnt Corral

Figure 1 is a map of all of the roads showing the open Forest Service System Roads within the Burnt Corral Boundaries before further analysis was applied (Existing Condition).

The white lines in Figure 1 are the roads open to the public for highway legal vehicles, the alternating black and white lines are roads open to the public which usually require high-clearance or four wheel drive vehicles.

Figure 1 - MVUM Roads (Open to the Public) within Burnt Corral Boundary

MVUM and closed roads in to Burnt Corral

Figure 2 shows all of the roads within the area of the Burnt Corral that includes those that are open to the public and those that are closed to the public (Please note the closed roads are the thin red lines):

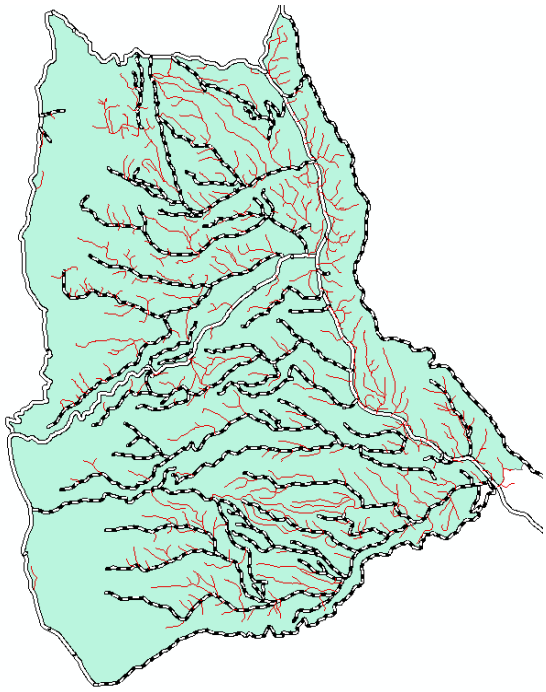


Figure 2 – All System Roads Available within Burnt Corral

From determining the acreage accessible by the roads within the Burnt Corral Boundary, a quarter mile buffer was created around all of our MVUM roads open to the public and then this area was overlaid on top the total acreage of the Burnt Corral Boundary and clipped to determine what percentage of the acreage that could be accessible with a skidder which is a commonly used practice to gather timber. This quarter mile buffer is typical during timber sale harvest and is derived from the centerline of the road on each side using GIS. Skidding of harvested trees back to a landing area in step terrain (i.e., greater than 40% slope) and for distances greater than ¼ of a mile will be avoided when possible. Cut unit boundaries and layouts using the existing roads system will greatly influence the skidding length, if whole tree skidding is utilized in harvesting. Little to no thinning is planned in steep sloped areas.

The GIS analysis shows that with the existing MVUM road system that approximately 87.7% of the acreage is accessible with a skidder. Using these existing MVUM roads that are regularly used by the public, already disturbed; a majority of the acreage can be effectively accessed from existing road network by using a skidder with minimal ground disturbances.

Total Acres Accessible within 1/4 Mile Buffer of Existing Roads (See Figure 3 Below)		
Total Acres of Burn Corral	Acres	Percentage
Acres Accessible by MVUM Roads (blue)	24,626.4	87.7%
Acres Not Accessible by MVUM Road (green)	3,459.7	12.3%
Total Acres =	28,086.1	100.0%

MVUM Roads compared to Burnt Corral

The following map and the blue area represents the acres that are accessible by the open roads from our existing MVUM.

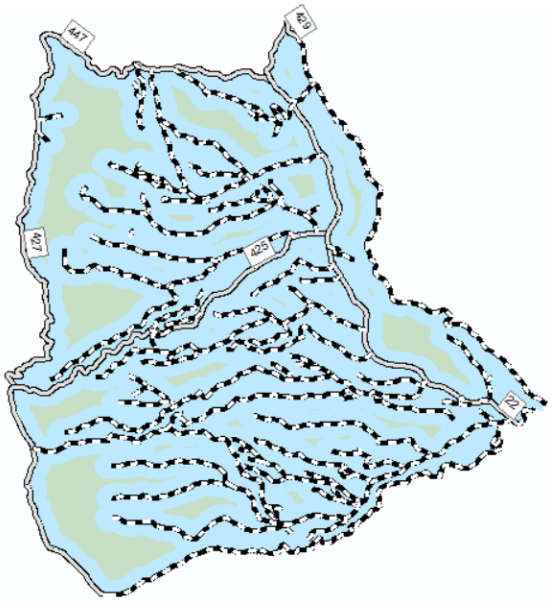


Figure 3 - MVUM with ¼ mile buffer roads (blue colored area) compared to Burnt Corral Boundary

Notice in the map above (figure 3) that there are pockets of acreage in green that will need to use a select group of closed roads to access the timber on a temporary basis.

A second analysis was conducted which overlaid these patches with the Forest Service system roads that are closed to public. The roads for this analysis assume that none of these roads will be reconstructed per the Forest Service Handbook 7709.59 definition but maintenance may be applied as follows per the handbook in order to bring the roads to a "Ready for Use" condition to haul timber. The commercial user is financially responsible for opening the road and making it "Ready for Use." The maintenance work activities described to prepare a maintenance level 1 road as "Ready for Use" is normally limited to removal (opening) of closure devices, brushing, removal and/or repair of minor slides or slumps, cleaning of roadside ditches and drainage devices, and grading of traveled way. Any road maintenance activities beyond these "Ready for Use" activities is considered road reconstruction or rebuilding the road template. Current road network will only see routine maintenance that will include Vegetation removal, blading, minor fill, and cleaning of existing drainage features.

Any other areas that are not accessible may use temporary roads constructed to access these areas. The blue areas represent another combined 1,851 of additional acreage reached of the total acreage using a ¼ mile buffer around selected Forest Service System Roads that are closed to the public. The brown line represent the closed roads that potentially could be temporarily opened to gather the timber. The pink areas is the inaccessible acreage due to the lack of any Forest Service System roads in the area. See figure 4 below.

Total Acres Accessible with 1/4 Mile Buffer (refer to figure 4 above)		
Total Acres of Burn Corral	Acres	Percentage
Acres Accessible by MVUM Roads (Blue)	24,626.4	87.7%
Acres Accessible w Select Closed Roads (Green)	1,851.0	6.6%
Acres Not Accessible by Roads (pink)	1,608.7	5.7%
Total Acres =	28,086.1	100.0%

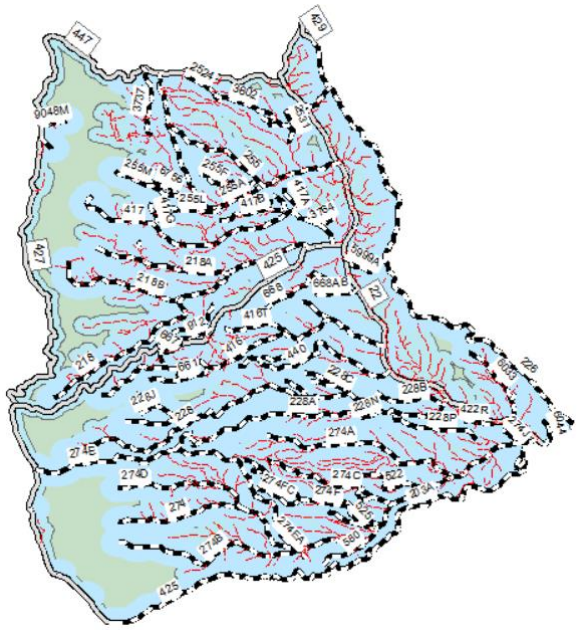


Figure 4 - System Roads within Burnt Corral Boundaries

System Roads compared to Burnt Corral

Figure 4 map shows the selected closed roads and MVUM roads combined providing access to 94.4% acreage:

The total miles of roads that are in storage that would give the additional 6.6% or 1,851 acres of access with a quarter mile buffer; total 40.3 miles out of the combined 128.4 miles of roads closed to the public. This represents only needing to use approximately 31.4% of the roads in storage. The remaining acreage would need less than 10-miles of temporary roads created in order to access the remaining areas on the west side of the Burnt Corral project area. Under the A and B Provisions of the Timber Sale administration are the T-specifications that provide rules for basic maintenance activities of the road system.

All of the GIS shapefile data and feature classes has been given to the NEPA coordinator so it is available for review in case of an audit.

System Roads on existing Terrain compared to Burnt Corral

Timber restoration using mechanical equipment is limited to terrain slopes. Wheeled track machinery is practical up to a 20% slope, while tracked equipment is practical up to 40%. Above 40% restoration efforts using tracked or wheeled machinery is not practical in most cases.

Within the map shown above and where the road system is not within the ¼ mile buffer of the roads, a majority of the boundary area outside the ¼ mile buffer is above the 40% slope for typical heavy machinery limits. Additional examples of methods of forest restoration suitable for slopes greater than 40% would be had trimming, cable logging, helicopter logging, and some instances a Ponsse may be used on slopes up to 70%. Additional temp roads may be needed to support such operations.

System Roads on existing Terrain compared to Burnt Corral

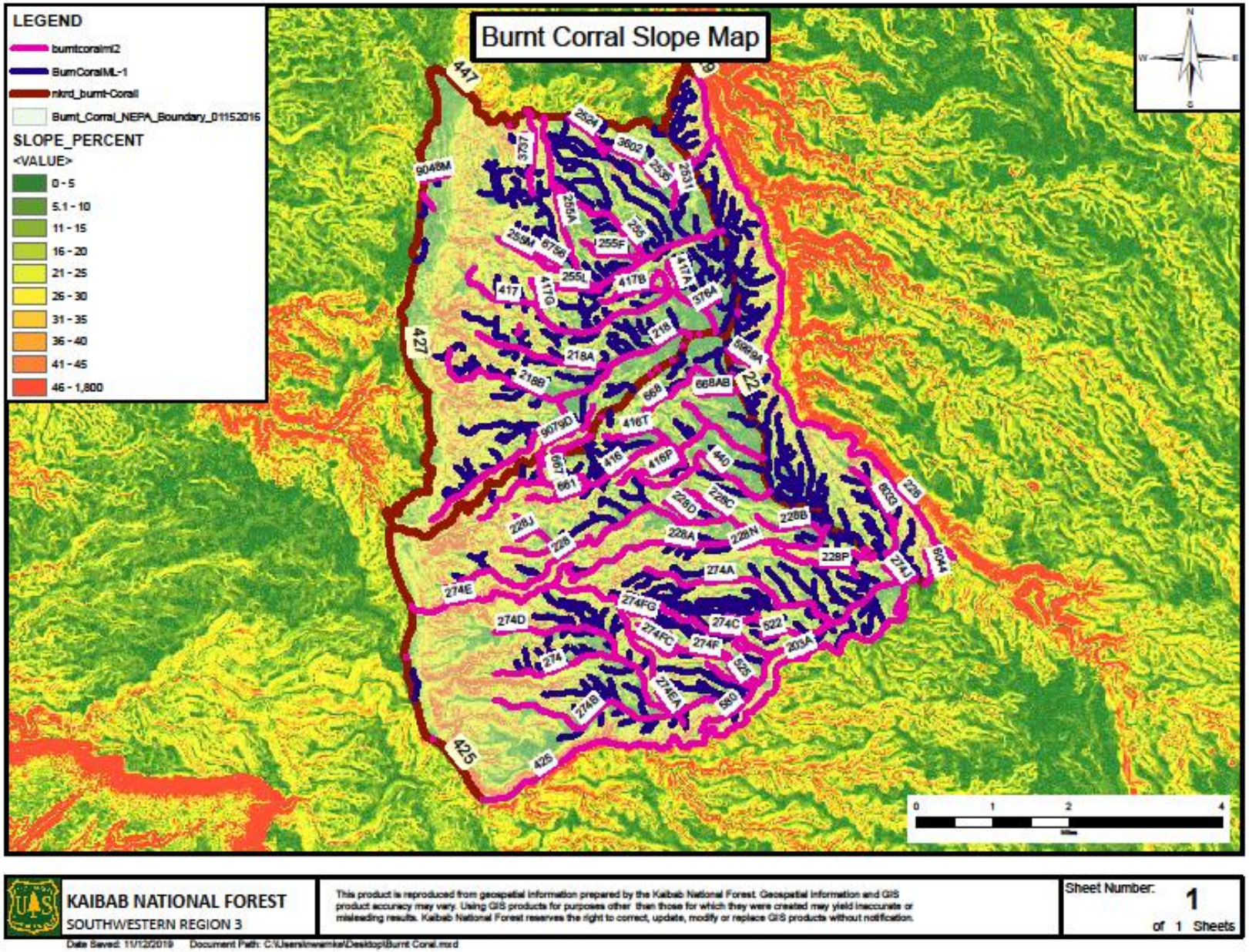


Figure 5 Burnt Corral Slope map

Literature

Road operations on FS jurisdictions roads can be characterized by what use is allowed on a road, and for what purpose the roads are maintained. A subset of forest roads on the forest is designated for motorized use by the public. These roads are displayed on the Motorized Vehicle Use Map (MVUM).

All roads on the Forest are also categorized by Maintenance Levels 1 through 5, operational and objective. Operational Maintenance Level ranges from level 1 (in storage) through level 5 (maintained for high levels of passenger comfort). Roads may be currently maintained at one level and planned to be maintained at a different level at some future date. The operational maintenance level is the maintenance level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns; in other words, it defines the level to which the road is currently being maintained. The objective maintenance level is the maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns. The objective maintenance level may be the same as, or higher or lower than, the operational maintenance level. The transition from operational maintenance level to objective maintenance level may depend on reconstruction or disinvestment.

FSH 7709.59

62.32 - Maintenance Level Descriptions

Maintenance levels 1-5 (operational and objective) are described in the following paragraphs:

1. LEVEL 1. These are specified roads that have been placed in storage between temporary intermittent uses. The period of storage must exceed 1 year. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate" all traffic on road. These roads are not shown on motor vehicle use maps.

Roads receiving level 1 maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic but may be available and suitable for non-motorized uses.

2. LEVEL 2. Assigned to roads open for use by high clearance vehicles. Passenger car traffic, user comfort, and user convenience are not considerations. Warning signs and traffic control devices are not provided with the exception that some signing, such as W-18-1 “No Traffic Signs,” may be posted at intersections. Motorists should have no expectations of being alerted to potential hazards while driving these roads. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either to:

a. Discourage or prohibit passenger cars, or

b. Accept or discourage high clearance vehicles.

3. LEVEL 3. Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. The Manual on Uniform Traffic Control Devices (MUTCD) is applicable. Warning signs and traffic control devices are provided to alert motorists of situations that may violate expectations.

Roads in this maintenance level are typically low speed with single lanes and turnouts. Appropriate traffic management strategies are either "encourage" or "accept." "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users.

4. LEVEL 4. Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. Manual on Uniform Traffic Control Devices is applicable. The most appropriate traffic management strategy is "encourage." However, the "prohibit" strategy may apply to specific classes of vehicles or users at certain times.

5. LEVEL 5. Assigned to roads that provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated. Manual on Uniform Traffic Control Devices is applicable. The appropriate traffic management strategy is "encourage."

In addition the Forest Service allows roads that are in storage to be revived on a temporary basis for commercial activities such as a timber harvest. FSH 7709.59 section 63.41 gives specific instructions and allowable road maintenance activities for making an operational maintenance level 1 Forest Service System Road as “Ready for Use” by a commercial user in such events as a timber harvest. There is a fine line between maintaining a road that is in storage for a temporary use and reconditioning a road. Under this engineering analysis, any Operational Maintenance Level 1 Road that is closed may be used as a temporary road and section highlighted in bold under 63.41 is the generally acceptable maintenance that can be performed on the road to make it ready for use. None of these Operational Maintenance Level 1 roads are not to be reconditioned in order to minimize the overall impacts on the ground as part of following engineering best management practices. See section 63.41 below:

63.41 - Responsibility and Associated Costs

Determine the total costs associated with on-the-ground maintenance performance by computing the total amount of work of each activity to be performed and applying realistic costs. Next, determine each user's commensurate financial responsibility. The preferred procedure for this determination is described below. Other procedures may be used provided the procedures comply with the intent of the Forest Roads and Trails Act of 1964 (16 U.S.C. 532-538) and have been approved by the regional forester. This procedure is not applicable to cost share roads. See section 63.22 for direction on cost share roads. See FSM 2400 and FSH 2409.15, Timber Sale Administration Handbook, for policy and guidelines on timber sale maintenance requirements and allowances.

1) Roads Assigned to Maintenance Levels 1 and 2. Most roads managed in maintenance levels 1 or 2 prior to commercial use, experience only minor noncommercial traffic during periods of commercial use. If noncommercial traffic is significant during periods of commercial use, it may be discouraged with temporary traffic control warning signs about timber harvest activities or regulated by order (36 CFR 261) and signed accordingly. Therefore, the impact of

noncommercial traffic on the total maintenance needs during periods of commercial use will usually be insignificant. The Forest Service is financially responsible for maintenance work made necessary due to closure trespass and for road damage caused by public use during periods when public traffic is significant (for example, hunting season).

a. Maintenance Level 1 Roads. The Forest Service is financially responsible for basic custodial care during the nonuse period prior to commercial use, to keep the road stable, drainage functional, and resource damage at an acceptable level.

The commercial user is financially responsible for opening the road and making it ready for use. Maintenance work to prepare a maintenance level 1 road for use is normally limited to removal (opening) of closure devices, brushing, removal and/or repair of minor slides or slumps, cleaning of roadside ditches and drainage devices, and grading of traveled way. Use reconstruction procedures to accomplish work exceeding these guidelines.

The commercial user is financially responsible for maintaining the road during the period of commercial use. The closing of the road, following the period of use, is the financial responsibility of the last commercial user. The commercial user may perform the closure work or, at Forest Service option, deposit funds for the Forest Service to perform the work following completion of post-sale activities. If the Forest Service requires the road to remain open for reasons not associated with the commercial activity, the Forest Service becomes financially responsible for closing the road at some future date

b. Maintenance Level 2 Roads. Any maintenance work required to be completed prior to the start of commercial use to accommodate such use is the financial responsibility of the commercial user. Use reconstruction procedures to accomplish substantial improvements in road standard, to make extensive repairs, or to raise the traffic service level.

The commercial user is responsible for all required road maintenance during the period of commercial use.

2) Roads Assigned to Maintenance Levels 3, 4, and 5. Generally a mixture of commercial and noncommercial traffic exists on these roads.
   a. Routine Maintenance. The financial responsibility for all routine maintenance is shared by the Forest Service and other users. Determine each user's financial responsibility on the basis of traffic units generated by their use. A traffic unit is defined as the average weight of a light, noncommercial vehicle having four or more wheels, passing a given point on a road, moving in either direction. Assign all other vehicles an equivalent traffic unit based on the ratio of their weight to that of the light, noncommercial vehicle. Establish the average weight of light, noncommercial vehicles based on sample traffic counts or other reliable data.

Limit Forest Service financial responsibility to a commensurate share of those maintenance activities required to be performed for the maintenance level assigned to the road prior to commencement of commercial use. For example, if dust abatement was not required prior to commercial use, but is required to accommodate commercial use, it should be financed entirely by the commercial user.

b. Other than Routine Maintenance. Determine the financial responsibility for other than routine maintenance in three different categories as follows:

- Surfacing Replacement. Establish surfacing replacement rates based on the best information available. Specify replacement rates by surfacing type and quantify in easily defined common units of measure such as cubic yards or tons of material per thousand board feet or ton-mile of haul. Use the following equation to determine each user's financial responsibility: User's financial responsibility = (Amount of haul) x (replacement rate) x (unit cost of material). Unit cost is estimated at the date of application, not to exceed the life of the timber sale, or 5 years for other situations.

The Forest Service is financially responsible for any deficit existing between the amount of funds collected by the above procedure and the total funds required to accomplish the work.

Commercial users may elect to replace the surfacing on existing roads or deposit funds for future replacement by the Forest Service. The procedure to be followed will be determined by the Forest Service on a case-by-case basis.

- Maintenance Items with a Work Cycle of 5 Years or Less. The financial responsibility for this work is shared by the Forest Service and other users based on traffic units. Items of work may include brushing, pavement maintenance, and structure maintenance. Use the best information available to project traffic over the work cycle period. Estimate the cost of the work at the time of planned performance.

Also use this procedure in those situations where the life of a timber sale exceeds 5 years.

- Maintenance Items with a Work Cycle Exceeding 5 Years. Financial responsibility for this work is normally assigned to the Forest Service. Exceptions can be made, on a case-by-case basis, for unusual high cost items such as painting of large bridges whose work cycle exceeds 5 years.

Affected Environment / Environmental Consequences

System roads used by motorized vehicles will see typical wearing such as gravel loss, rutting, and potholing. Normal traffic over a period of time will create issues as described, heavy haul vehicle typically will see a faster degradation of roads, especially in varying climate conditions. Rain, wind, snow, and other climate conditions will always continue to effect the road system. Rain and snow will reduce the strength of the road depending on saturation, and wind/sun will cause increasing blowing fine particles during heavy use. Based the most recent projects located on similar terrain on the NKRD (i.e., the Jacob Ryan project and the Plateau Facility Fire protection project), it has been determined that addition or temporary road construction will most likely not be necessary, therefore little-to-no effect or environmental consequence is anticipated, as related to temporary roads.

Much of the ML-2 and ML-1 roads are overgrown or have seen little maintenance, causing drainages to be blocked. Utilization of these roads will restore drainage to the road, and increase the integrity of the existing roads system as the roads are maintained for restoration efforts.

Note: construction of temporary roads is not anticipated for the BC area; utilization of existing Forest Service roads that are currently closed will alleviate the need and avert temporary road construction. Construction of temporary roads releases settled earthen material that has stabilized in existing condition. During operations temporary roads will see an increase in erosion or sediment transportation

from inclement weather and wind driven dust. The decommissioning of the roads will see the roads ripped to loosen compacted material from hauling and if necessary added water control features/mulch as stated in the best management practices. Continued erosion or sediment movements are to be expected until vegetation from re-seeding is established, or until layers of pine mulch or grass is re-established.

Cumulative Effects

The Vegetation treatments or restoration efforts will see an additional benefit for the roads. As trees are removed within or directly adjacent to system roads, they will become dryer (due to more sunshine and natural evaporation) and hold up to traffic for longer periods of time. Additionally, the main boundary roads that serve as hold points for designated burn blocks may act as a firebreak and hav a higher potential of successfully restricting fire movement from crossing main roads/lines.

The vegetation treatment or restoration efforts will utilize heavy equipment and machinery on the road system. Large commercial vehicles will wear out the surface faster than they typical passenger cars. Access routes to and from the BC area (i.e., surrounding areas along the haul routes) will experience increased surface degradation such as pot holing, soft spots, gullying due to loss of soil hardening. If traffic is diverted around forest restoration areas, additional wear and tear may occur on areas that are adjacent to those restoration areas, depending upon the amount of traffic. (Note, most roads within the interior of BC boundary are roads that receive little use during the year. Additionally, most of the BC area may be inaccessible during winter months when snow depths make the area impassible. Thus usage of roads in the area at elevations above 6000 feet, are usually limited to the months of April through November.

For Natural Ground Roads

ML-1 roads are usually relayed back to natural earth after the sale is over. ML-1 roads vegetate back fairly easy and will not have much of an effect long after the sale is over.

ML-2 roads that will be consciously open, will see typical road degrading without routine maintenance. Normal road degradation would be vegetative growth, soft and slick portions of the road, rutting, and soil loss.

For Graveled Roads

ML2/Ml3 roads that are continuously open will see greater gravel loss, wash boarding, potholing, and rutting causing erosion or displacement of the gravel overlay, due to loss of the soil hardened layer from wear and tear of the heavy traffic loads. (Only portions of FSR 22 and FSR 425 are graveled; most other roads within BC Boundary are dirt, or native soils with little to no additional gravel overlay.)

Access Road - Existing Asphalt Road FSR 22

The current asphalt road FSR 22 is currently reached the end of the anticipated lifespan of the road of 25 years. (Note: the start or access to paved portions of FSR 22 are located some 8 miles north of the project area; see figure 6 below, red line indicates the paved portion of FSR 22) The road was built in the mid 90's by a local logging company as a way to expedite hauling of trees out of the forest. The current road 2-3 inch in depth for 22-miles from just north of the USFS District Boundary (17-miles from AZ 89A) through State/BLM/Private land to the City of Fredonia. The portion of Asphalt on USFS administration area is approximately 5-miles, but the Forest Service is responsible for maintaining all 22

miles under the current right-of-way use permit. The road will see a continued and accelerated degradation from delamination, potholing, and cracking due to the heavy loads and age of the pavement. Whether FSR 22 will be used as a haul road back to the City of Fredonia or the north, has yet to be determined, as it is a road that requires a paid commercial use permit for any commercial vehicles hauling or transporting goods (gravel or timber) on the road.

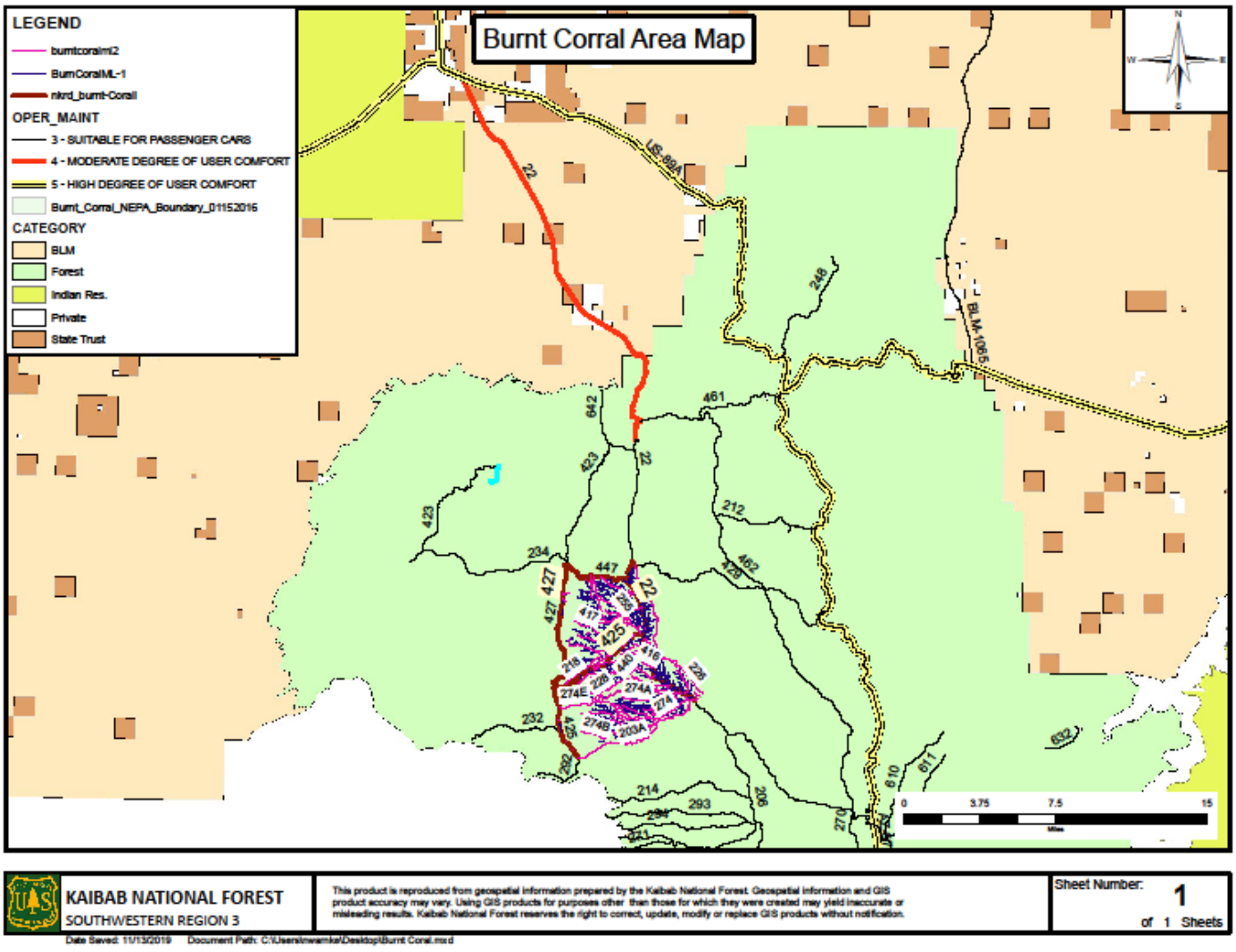
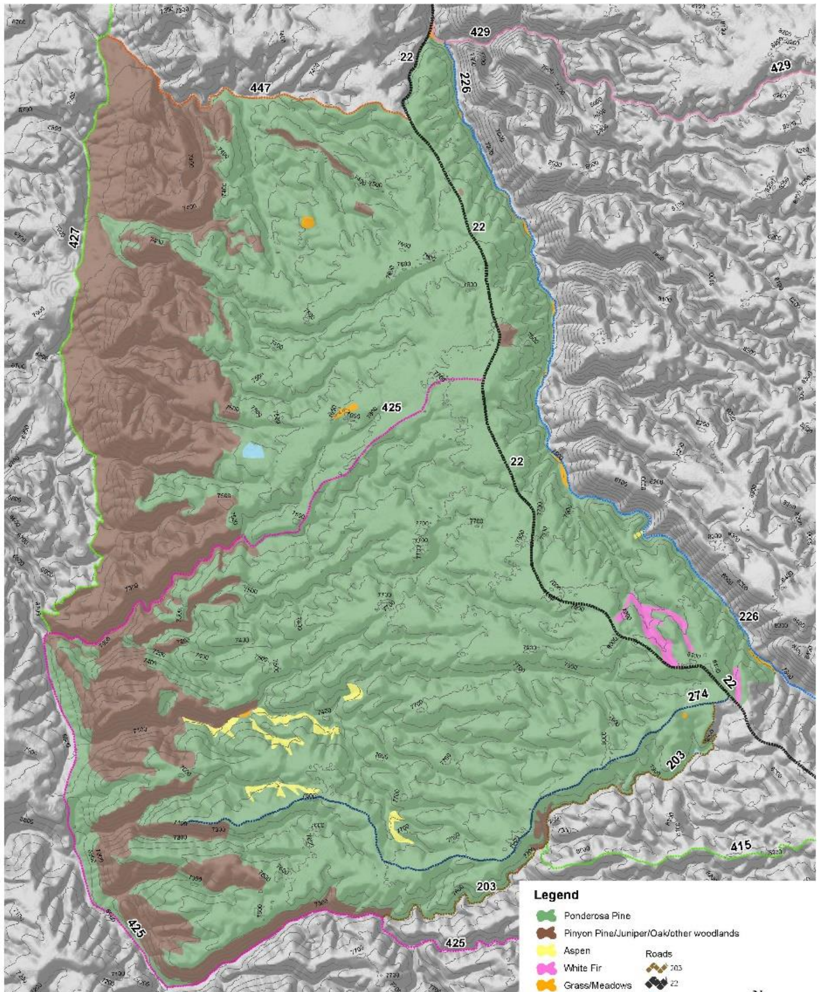


Figure 6 Area Map

Burnt Corral Vegetation Types

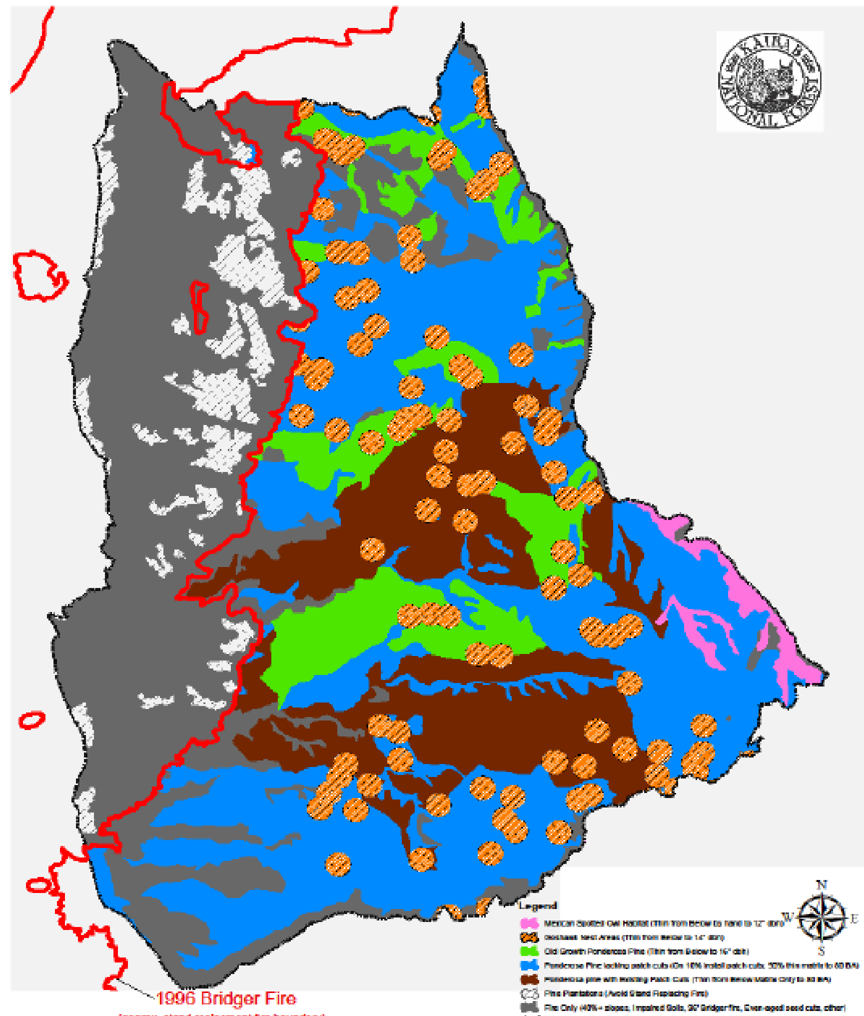
North Kaibab Ranger District
Kaibab National Forest



Primary Cover Type Acre Summary	Acres	%
Ponderosa Pine	21,202	75.5
Pinyon Pine/Juniper/Oak/otherwoodlands	6,532	23.3
Aspen	149	0.5
White Fir	110	0.4
Grass/Meadows	74	0.3
Wetlands	19	0.1
Total >>>	28,086	100.0

Burnt Corral Proposed Action Mechanical Treatments

North Kaibab Ranger District
Kaibab National Forest



These approx. Acreages include deductions for 40%+ slopes in all Mechanical Trt.s except MSO where hand thinning can occur on steeper slopes. No Mech. Trt. Acres exist on Impaired Soils. See separate 40%+ slopes/impaired soils/roads map to see the 40%+ slope model used for acre deductions. These are only estimates. Clinometers will be used for actual field layout.

0 0.3 0.6 1.2 1.8 2.4 Miles

Map Scale P. Callaway 03/21/2016

Proposed Treatment by Strata Acre Summary Table

Acres	Proposed Action Treatment Description	Strata Description
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	Total Mechanical Treatment Acres (besides fireline construction)	
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	Total Fire Only Acres (Including fireline construction)	
[illegible]	Grand Total (Mechanical and Fire Only)	